

CLAIMS

1. Detergent particles having an average particle size of from 150 to 500 μm and a bulk density of
5 500 g/liter or more, wherein the detergent particles comprise a detergent particle being capable of releasing a bubble from an inner portion of the detergent particle in a process of dissolving the detergent particle in water, the bubble having a size of one-tenth or more of a particle size of the detergent particle, and wherein the detergent particles have a dissolution rate of 90% or
10 more, under conditions where the detergent particles are supplied in water at 5°C; stirred for 60 seconds under the stirring conditions that 1 g of the detergent particles is supplied to a one-liter beaker having an inner diameter of
15 105 mm which is charged with one-liter of hard water having 71.2 mg $\text{CaCO}_3/\text{liter}$, wherein a molar ratio of Ca/Mg is 7/3, and stirred with a stirring bar of 35 mm in length and 8 mm in diameter at a rotational speed of 800 rpm; and
20 filtered with a standard sieve having a sieve-opening of 74 μm as defined by JIS Z 8801, wherein the dissolution rate of the detergent particles is calculated by Equation (1):

$$\text{Dissolution Rate (\%)} = [1 - (T/S)] \times 100 \quad (1)$$

25 wherein S is a weight (g) of the detergent particles

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supplied; and

T is a dry weight (g) of remaining insolubles of the detergent particles remaining on the sieve when a liquid prepared under the above stirring conditions is filtered with the sieve, wherein drying conditions for the remaining insolubles are keeping at a temperature of 105°C for 1 hour, and then in a desiccator with a silica gel at 25°C for 30 minutes.

10 2. Detergent particles having an average particle
size of from 150 to 500 μm and a bulk density of
500 g/liter or more, wherein the detergent particles
comprise a detergent particle being capable of releasing a
bubble from an inner portion of the detergent particle in
15 a process of dissolving the detergent particle in water,
the bubble having a size of one-tenth or more of a
particle size of the detergent particle, and wherein the
detergent particles have a dissolution rate of 82% or
more, under conditions where the detergent particles are
20 supplied in water at 5°C; stirred for 30 seconds under the
stirring conditions that 1 g of the detergent particles is
supplied to a one-liter beaker having an inner diameter of
105 mm which is charged with one-liter of hard water
having 71.2 mg CaCO_3 /liter, wherein a molar ratio of Ca/Mg
25 is 7/3, and stirred with a stirring bar of ~35 mm in length

and 8 mm in diameter at a rotational speed of 800 rpm; and filtered with a standard sieve having a sieve-opening of 74 μm as defined by JIS Z 8801, wherein the dissolution rate of the detergent particles is calculated by Equation

5 (1):

$$\text{Dissolution Rate (\%)} = [1 - (T/S)] \times 100 \quad (1)$$

wherein S is a weight (g) of the detergent particles supplied; and

T is a dry weight (g) of remaining insolubles of the detergent particles remaining on the sieve when a liquid prepared under the above stirring conditions is filtered with the sieve, wherein drying conditions for the remaining insolubles are keeping at a temperature of 105°C for 1 hour, and then in a desiccator with a silica gel at 25°C for 30 minutes.

3. The detergent particles according to claim 1 or 2, wherein the detergent particles are a collective of a detergent particle comprising a base particle comprising a water-insoluble inorganic compound, a water-soluble polymer and a water-soluble salt, and a surfactant supported by the base particle, wherein the base particle has a localized structure in which larger portions of the water-soluble polymer and the water-soluble salt are present near the surface of the base particle rather than

in the inner portion thereof.

4. Detergent particles having an average particle size of from 150 to 500 μm and a bulk density of
5 500 g/liter or more, wherein the detergent particles are a collective of a detergent particle comprising a base particle comprising a water-insoluble inorganic compound, a water-soluble polymer and a water-soluble salt, and a surfactant supported by the base particle, wherein the
10 base particle has a localized structure in which larger portions of the water-soluble polymer and the water-soluble salt are present near the surface of the base particle rather than in the inner portion thereof, and wherein the detergent particles have a dissolution rate of 90% or more, under conditions where the detergent
15 particles are supplied in water at 5°C; stirred for 60 seconds under the stirring conditions that 1 g of the detergent particles is supplied to a one-liter beaker having an inner diameter of 105 mm which is charged with
20 one-liter of hard water having 71.2 mg CaCO_3 /liter, wherein a molar ratio of Ca/Mg is 7/3, and stirred with a stirring bar of 35 mm in length and 8 mm in diameter at a rotational speed of 800 rpm; and filtered with a standard sieve having a sieve-opening of 74 μm as defined by JIS Z
25 8801, wherein the dissolution rate of the detergent

particles is calculated by Equation (1):

$$\text{Dissolution Rate (\%)} = [1 - (T/S)] \times 100 \quad (1)$$

wherein S is a weight (g) of the detergent particles supplied; and

- 5 T is a dry weight (g) of remaining insolubles of the detergent particles remaining on the sieve when a liquid prepared under the above stirring conditions is filtered with the sieve, wherein drying conditions for the remaining insolubles are keeping at a temperature of 105°C for 1 hour, and then in a desiccator with a silica gel at 25°C for 30 minutes.

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5. Detergent particles having an average particle size of from 150 to 500 μm and a bulk density of 500 g/liter or more, wherein the detergent particles are a collective of a detergent particle comprising a base particle comprising a water-insoluble inorganic compound, a water-soluble polymer and a water-soluble salt, and a surfactant supported by the base particle, wherein the base particle has a localized structure in which larger portions of the water-soluble polymer and the water-soluble salt are present near the surface of the base particle rather than in the inner portion thereof, and wherein the detergent particles have a dissolution rate of 82% or more, under conditions where the detergent

particles are supplied in water at 5°C; stirred for
30 seconds under the stirring conditions that 1 g of the
detergent particles is supplied to a one-liter beaker
having an inner diameter of 105 mm which is charged with
5 one-liter of hard water having 71.2 mg CaCO₃/liter, wherein
a molar ratio of Ca/Mg is 7/3, and stirred with a stirring
bar of 35 mm in length and 8 mm in diameter at a
rotational speed of 800 rpm; and filtered with a standard
sieve having a sieve-opening of 74 µm as defined by JIS Z
10 8801, wherein the dissolution rate of the detergent
particles is calculated by Equation (1):

$$\text{Dissolution Rate (\%)} = [1 - (T/S)] \times 100 \quad (1)$$

wherein S is a weight (g) of the detergent particles
supplied; and

15 T is a dry weight (g) of remaining insolubles of the
detergent particles remaining on the sieve when a liquid
prepared under the above stirring conditions is filtered
with the sieve, wherein drying conditions for the
remaining insolubles are keeping at a temperature of 105°C
20 for 1 hour, and then in a desiccator with a silica gel at
25°C for 30 minutes.

6. The detergent particles according to claim 4 or
5, wherein the detergent particles comprise a detergent
25 particle having pores in the inner portion thereof having

a size of one-tenth to four-fifth of the particle size.

7. The detergent particles according to any one of
claims 4 to 6, wherein the base particle comprises 20 to
5 90% by weight of the water-insoluble inorganic compound; 2
to 30% by weight of the water-soluble polymer; and 5 to
78% by weight of the water-soluble salt.

10 8. The detergent particles according to any one of
claims 1 to 7, wherein the detergent particles comprise a
uni-core detergent particle.

15 9. A method for preparing the detergent particles
as defined in any one of claims 1 to 8, comprising the
steps of:

Step (a): preparing a slurry containing a water-insoluble
inorganic compound, a water-soluble polymer, and
a water-soluble salt, wherein 60% by weight or
more of water-soluble components including the
20 water-soluble polymer and the water-soluble salt
is dissolved in the slurry;

Step (b): spray-drying the slurry obtained in Step (a) to
prepare base particles; and

Step (c): adding a surfactant to the base particles
obtained in Step (b) to support the surfactant

thereby.

10. A detergent composition comprising the detergent
particles as defined in any one of claims 1 to 8 in an
5 amount of 50% by weight or more.

11. A detergent composition having an average
particle size of from 150 to 500 μm and a bulk density of
500 g/liter or more, wherein the detergent composition
comprises a detergent particle being capable of releasing
10 a bubble from an inner portion of the detergent particle
in a process of dissolving the detergent particle in
water, the bubble having a size of one-tenth or more of a
particle size of the detergent particle, and wherein the
detergent composition has a dissolution rate of 90% or
15 more, under conditions where the detergent composition is
supplied in water at 5°C; stirred for 60 seconds under the
stirring conditions that 1 g of the detergent composition
is supplied to a one-liter beaker having an inner diameter
20 of 105 mm which is charged with one-liter of hard water
having 71.2 mg $\text{CaCO}_3/\text{liter}$, wherein a molar ratio of Ca/Mg
is 7/3, and stirred with a stirring bar of 35 mm in length
and 8 mm in diameter at a rotational speed of 800 rpm; and
filtered with a standard sieve having a sieve-opening of
25 74 μm as defined by JIS Z 8801, wherein the dissolution

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rate of the detergent composition is calculated by

Equation (1):

$$\text{Dissolution Rate (\%)} = [1 - (T/S)] \times 100 \quad (1)$$

wherein S is a weight (g) of the detergent composition

5 supplied; and

T is a dry weight (g) of remaining insolubles of the
detergent composition remaining on the sieve when a liquid
prepared under the above stirring conditions is filtered
with the sieve, wherein drying conditions for the
10 remaining insolubles are keeping at a temperature of 105°C
for 1 hour, and then in a desiccator with a silica gel at
25°C for 30 minutes.

12. A detergent composition having an average
15 particle size of from 150 to 500 μm and a bulk density of
500 g/liter or more, wherein the detergent composition
comprises a detergent particle being capable of releasing
a bubble from an inner portion of the detergent particle
in a process of dissolving the detergent particle in
20 water, the bubble having a size of one-tenth or more of a
particle size of the detergent particle, and wherein the
detergent composition has a dissolution rate of 82% or
more, under conditions where the detergent composition is
supplied in water at 5°C; stirred for 30 seconds under the
25 stirring conditions that 1 g of the detergent composition

is supplied to a one-liter beaker having an inner diameter of 105 mm which is charged with one-liter of hard water having 71.2 mg CaCO₃/liter, wherein a molar ratio of Ca/Mg is 7/3, and stirred with a stirring bar of 35 mm in length and 8 mm in diameter at a rotational speed of 800 rpm; and filtered with a standard sieve having a sieve-opening of 74 µm as defined by JIS Z 8801, wherein the dissolution rate of the detergent composition is calculated by

5 Equation (1):

10 Dissolution Rate (%) = [1 - (T/S)] × 100 (1)

wherein S is a weight (g) of the detergent composition supplied; and

15 T is a dry weight (g) of remaining insolubles of the detergent composition remaining on the sieve when a liquid prepared under the above stirring conditions is filtered with the sieve, wherein drying conditions for the remaining insolubles are keeping at a temperature of 105°C for 1 hour, and then in a desiccator with a silica gel at 25°C for 30 minutes.